

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/BR2004/000243

International filing date (day/month/year)
15.12.2004

Priority date (day/month/year)
30.12.2003

International Patent Classification (IPC) or both national classification and IPC
H03K17/13

Applicant
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1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/BR2004/000243

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-25
	No: Claims	
Inventive step (IS)	Yes: Claims	1-25
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-25
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V.

- 1 Reference is made to the following documents:

D1 : GB 1 498 397 A (MULLARD LTD) 18 January 1978 (1978-01-18)

D2 : DE 31 14 433 A1 (SIEMENS AG; SIEMENS AG, 1000 BERLIN UND 8000
MUENCHEN, DE) 11 November 1982 (1982-11-11)

D3 : US 5 734 289 A (KHUDOSHIN ET AL) 31 March 1998 (1998-03-31)

- 2 The present invention relates to a system and method for controlling the timing and duration of trigger pulses applied to a TRIAC under varying conditions of load current.
- 3 Document D1 is considered to represent the most relevant prior art and discloses (the references in parentheses applying to this document) a system and corresponding method for supplying an AC voltage to a source comprising (Fig. 1):
- a TRIAC (T) in series with a load (L);
 - a detection unit (DET) for detecting the voltage between the cathode and the anode of the TRIAC;
 - a detection unit (200) for detecting the passage of the feed network voltage (2) by zero;
 - a power unit (AC voltage source across terminals 1 and 2);
 - a control unit (G1, COMP, 100, I1);
 - the voltage detection unit (DET) being electrically connected to the control unit (G1);
 - the control unit generating a pulse at the gate of the TRIAC to keep it in conduction and the pulse at the gate being generated from a comparison between a predetermined voltage limit value and a voltage measured between cathode and anode of the TRIAC (page 3, left-hand column, line 47 - page 3, right-hand column, line 109).

From this, the subject-matter of independent claims 1, 17 and 23 differs in that the voltage detection unit measures the voltage at the gate of the TRIAC and not across its cathode and anode and the voltage limit value is established by the control unit.

- 3.1 The subject-matter of claims 1, 17 and 23 is therefore novel (Article 33(2) PCT).
The problem to be solved by the present invention may be regarded as how to optimize the timing of the TRIAC's trigger pulses for different amplitudes of the load current.

- 3.2 The solution to this problem proposed in claims 1, 17 and 23 of the present application is considered as involving an inventive step (Article 33(3) PCT) because none of the currently available prior art documents D1-D3 suggests the use of a variable voltage limit value established by the control unit as an input to the comparator of the trigger pulse generator. In particular, document D2 discloses a trigger pulse generator, wherein the timing of the pulse generation results from the comparison of the triac's cathode voltage against two predefined voltage limit values (Fig. 2: voltages U1 and U3 input to comparators K1 and K2) whilst in D3 the gate voltage is also compared against two preestablished voltage limit values (Fig. 1: inputs 13 and 14 to comparators 7 and 8; col. 2, lines 63-66).
- 3.3 Claims 2-16, 18-22 and 24-25 are respectively dependent on claims 1, 17 and 23 and as such also meet the requirements of the PCT with respect to novelty and inventive step.